

ABSTRACT OF THE DISCLOSURE

A method and apparatus for interference suppression in wireless communication systems, especially Orthogonal Frequency Division Multiplexed (OFDM) systems. The array apparatus includes a two-tier adaptive array system which provides for both spatial diversity and beamforming at the uplink. The adaptive array is comprised of sub-arrays spaced at a distance sufficient to provide spatial diversity, ideally 5 to 15 wavelengths at the frequency of operation. Each sub-array is composed of at least two antenna elements spaced in proximity sufficient to provide effective beamforming or scanning, ideally less than one-half of one wavelength at the frequency of operation. The Direction of Arrival (DOA) of signals impinging upon the array can be calculated by comparing signals from sub-array elements. Each sub-array can then be filtered or beamformed so as to provide high gain to desired signals received from the DOA (which may be a multipath signal) while at the same time damping out undesired signals such as co-channel interference (CCI) in the frequency band of operation. The DOA is also used in a method of allocating frequency bins for data signals, such as in an OFDMA system, to provide weighted guidelines for bin allocation to maximize received signal power.